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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
HODGE, ROBERT W	

ART UNIT	PAPER NUMBER
1745	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/780,488	GOEBEL, STEVEN G.	
	Examiner	Art Unit	
	Robert Hodge	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 July 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) *1-17* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *18-25,28 and 29* is/are rejected.

7)☒ Claim(s) *26 and 27* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 7/27/07 have been fully considered but they are not persuasive. Applicants argue that the Cargnelli reference does not teach the newly added limitations to amended claim 18. This is not found persuasive for at least the fact that claim 18 is now indefinite which will be clarified in the proceeding rejection.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 18 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 18 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: a means for introducing fuel from the anode flowpath to the cathode flowpath which contains the recycled fluid, a means for reacting the fuel with oxygen and a further means for halting the flow of fuel to the cathode when a predetermined condition is met that is commensurate with a substantial consumption of said oxygen in said recirculating loop or how to determine when a substantial consumption of the oxygen has occurred. In the Attorney Remarks/Arguments filed 7/27/07 applicants direct the examiner to a

passage in their specification that describes the use of the inerting valve 344 that is disposed in a passage that connects the anode flowpath with the cathode flow path that is only capable of allowing fuel to flow from the anode flowpath to the cathode flow path. However there is no such passage disclosed in claim 18. If applicants are relying on the recitation of "an anode purge flowpath configured to selectively couple said recirculating loop to said anode" then no support is found their either, especially by evidence in dependent claim 19 requiring a "purge valve" to be disposed in the "anode purge flowpath". Therefore the anode purge flowpath as recited in the claim and defined by the instant specification is not capable of introducing fuel from the anode flowpath to the cathode flowpath, which contains the recycled fluid containing oxygen. Furthermore there is also no means present for halting the flow of fuel in the supposed passage (that is not present) connecting the anode flowpath with the cathode flowpath and therefore the instantly claimed invention is not capable of discontinuing the reacting of the fuel with the oxygen because there is no means present to perform said function. There is also no structure present that would allow for determining when a substantial consumption of the oxygen has occurred or what a substantial consumption of the oxygen is. It is also unclear to the Examiner how fuel being provided to the cathode flowpath, which contains the recycled fluid, can react with the oxygen in the recycled fluid when there is no means recited in the claim that would promote said reaction. The presence of hydrogen and oxygen together does not necessarily yield a reaction, a reaction between hydrogen and oxygen requires some sort of external influence such as a catalyst or ignition source for a reaction to take place, therefore the step of reacting

the fuel with the oxygen cannot take place because no structure is present for said reaction. Therefore due to all of the indefiniteness in claim 18 as currently amended it is the position of the Examiner that the Cargnelli reference still reads on the claims as recited and the prior art rejections will be maintained and as long as there is some sort of interaction between the anode stream and the cathode recycle stream in the prior art, such as the exchange of humidity it will read on the claim as recited.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 18-25 are rejected under35 U.S.C. 103(a) as being unpatentable over Cargnelli et al. (US 2004/0146761 A1).

With respect to claim 18,20, Cargnelli et al. teach a method of operating a furl cell system comprising a fuel cell that includes an anode, a cathode and a membrane, an anode flowpath (20) that includes a anode exhaust recirculation line (60), a cathode flowpath (30) that includes a cathode exhaust recirculation line (40). The humid cathode exhaust stream passes through a hydrogen humidifier (90) in which the heat and humidity is transferred to incoming dry hydrogen in the fuel supply line (20). Cargnelli et al. also teach the cathode exhaust stream can be transport through a bypass line (82) (i.e., discontinue the reaction between hydrogen fuel and recycled cathode exhaust). This can be followed by continued supply of reactants to purge the anode and cathode flowpaths in the fuel cell system. See paragraphs 21,22,25.

The disclosure of Cargnelli et al. differs from Applicant's claims in that Cargnelli et al. do not describe reacting fuel with the recycled cathode exhaust until a voltage measured across the fuel cell reaches a predetermined level. Cargnelli et al. teach it is preferable to humidify hydrogen stream first since anode dew point temperature is desired to be higher than the cathode dew point temperature because water is naturally transferred from the anode to the cathode in the fuel cell. It is preferable to use the cathode exhaust stream to exchange heat and humidity with incoming hydrogen stream first. Furthermore, Cargnelli teaches the cathode exhaust may bypass the incoming hydrogen stream depending on the operation condition of the fuel cell. See paragraphs 35,36. Therefore, it would have been obvious to one of ordinary skill in the art to let the cathode exhaust interact with hydrogen stream in the starting up of the fuel cell followed by bypassing the hydrogen stream, because Cargnelli discloses the hydrogen stream does not need to be humidified by the cathode exhaust after a particular voltage (or operation condition) is achieved.

With respect to claim 19, the hydrogen humidifier (90) in the Cargnelli reference can be considered as a purge valve disposed therein to affect the selective coupling. See Figure 1.

With respect to claim 21, the anode flowpath is filled with hydrogen after the bypass (82) is undertaken. See Figure 5B.

With respect to claim 22, the cathode flowpath is filled with air after the bypass (82) is undertaken. See Figure 5B.

With respect to claim 23, Cargnelli teaches the recirculation loop can be disabled by activating a cathode outlet drain line (42). See paragraph 23.

With respect to claim 24, it would have been obvious to one of ordinary skill in the art to let the cathode exhaust interact with hydrogen stream in the shutting down of the fuel cell followed by bypassing the hydrogen stream, because Cargnelli discloses the hydrogen stream does not need to be humidified by the cathode exhaust after termination of the fuel cell operation.

With respect to claim 25, Cargnelli teaches the use of cathode exhaust (substantially oxygen-depleted fluid) in the hydrogen humidifier. See Figure 1.

Claims 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cargnelli in view of U.S. Pre-Grant Publication No. 2002/0076583 hereinafter Reiser.

Cargnelli as discussed above is incorporated herein.

Cargnelli does not teach that the anode is purged with air from the oxygen source.

Reiser teaches that it is preferred to purge the anode with air from the oxygen source in order to rapidly displace the hydrogen in the anode, see paragraph 14 and figure 1.

At the time of the invention it would have been obvious to one having ordinary skill in the art to include the purge method and structure of Reiser in Cargnelli in order to provide a fuel cell system that can rapidly purge the hydrogen from the anode especially

during shutdown so that no more hydrogen is present in the anode to react and the fuel cell is then completely shut down with no residual reactions occurring.

Allowable Subject Matter

Claims 26 and 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. See reasons in the Non-Final Office Action dated 5/1/07.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent Nos. 6,399,231, and 6,984,464 and U.S. Pre-Grant Publication No. 2004/0126628 all teach providing a passage between the anode and cathode flow paths with a valve dispose therein to provide hydrogen to the cathode flow path.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert Hodge whose telephone number is (571) 272-2097. The examiner can normally be reached on 8:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RWH

JONATHAN CREPEAU
PRIMARY EXAMINER